

Large-scale live capture of Passenger Pigeons *Ectopistes migratorius* for sporting purposes: overlooked illustrated documentation

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SUMMARY.—More has been written concerning the extinction of Passenger Pigeon *Ectopistes migratorius* than any other extinct bird; the effects of trapping live birds for the shooting industry in the latter half of the 19th century is also seemingly well known. Here I present overlooked accounts and illustrations that appeared in contemporaneous newspapers describing the techniques used to capture live birds based on the experience of a professional pigeon trapper, and the subsequent fate of captured birds in shooting contests.

The extinction of Passenger Pigeon *Ectopistes migratorius* (Linnaeus, 1766) was one of the most damning and senseless of all human-caused extinctions: it defies belief that a bird so abundant could be exterminated in such a short period of time. In the first half of the 19th century Passenger Pigeons were reported in incomprehensible numbers. There are many reports of migratory flocks that numbered in their hundreds of millions, roosting sites that covered >100 km², and nesting colonies at such densities that the boughs of trees collapsed under their weight (Wilson 1808, Audubon 1831, Mitchell 1935, Schorger 1955, Eckert 1965, Blockstein & Tordoff 1985, Bucher 1992, Cokinos 2000, Blockstein 2002, Avery 2014, Foster 2014, Fuller 2014, Greenberg 2014). Passenger Pigeon occurred almost entirely in the eastern USA with the main nesting areas being centred on the Great Lakes (Schorger 1955), but also extended south and east from the southern Great Lakes (Blockstein 2002). Inevitably, such concentrations attracted the attention of a surging human population, especially in the rapidly developing eastern states. The pigeons were not only exploited as a food source, but were also considered an agricultural pest; entire crops could be rapidly destroyed if a large flock descended to feed (Mitchell 1935, Blockstein & Tordoff 1985). During the early 19th century, Passenger Pigeon was persecuted on an immense scale with seemingly no noticeable effect on numbers, but this was to drastically change after the end of the Civil War in 1865. In the 1860s, communication across the eastern states was augmented by an extensive telegraph system, followed by a dramatic increase in the number of railroads (Blockstein & Tordoff 1985, Blockstein 2002). This provided an ideal opportunity for professional pigeon hunters, known as 'pigeoners', to rapidly communicate the whereabouts of concentrations of birds, which resulted in almost perpetual exploitation (Schorger 1955, Blockstein & Tordoff 1985). This commercialisation of the pigeons for food and for live-bird capture for the sporting industry, along with deforestation, resulted in a rapid decline in numbers during 1871 to 1880, with the last great nesting concentrations reported in 1879–83 (Mitchell 1935, Schorger 1955, Blockstein & Tordoff 1985). A handful of wild individuals were collected during the 1890s, the last being taken around 1900 (Henniger 1902, Fuller 2014) or a year or two later (Greenberg 2014). At least three captive populations had been maintained since the 1870s but, due primarily to poor reproductive rates, by 1910 only a solitary female, 'Martha', remained (Fuller 1914), which died around midday on 1 September 1914 (Shufeldt 1915).

Illustrations of Passenger Pigeon trapping and shooting were published in various contemporary newspapers, most notably in *Frank Leslie's Illustrated Newspaper* (*FLIN* hereafter) and *The Illustrated Sporting and Dramatic News* (*ISDN*). An illustration appeared in the 21 September 1867 edition of *FLIN* (vol. XXV, no. 625, p. 8) entitled 'Netting wild pigeons in New England', with an accompanying image entitled 'Shooting wild pigeons in Iowa' (Fig. 1). Another illustration published in *ISDN* on 3 July 1875 entitled 'Winter sports in northern Louisiana: shooting wild pigeons. – sketched by Smith Bennett', which is the most frequently reproduced, was discovered by the author and natural historian Paul Hahn in a small barber's shop in Toronto (Mitchell 1935: 121; E. Fuller pers. comm. 2014; Fig. 2). Schorger (1955) considered this illustration to be the most accurate of all contemporary portrayals, and shows a somewhat similar scene as that in *FLIN* (Fig. 1).

Schorger (1955: 300) briefly mentioned images of pigeon-trapping techniques and shooting tournaments that appeared in various newspapers, which have never been fully reproduced. One of these includes a historically important full-page illustration published in *FLIN*, on 2 July 1881, entitled 'The sportsmen's tournament at Coney Island. – Methods of trapping and transporting the pigeons for use in the contests. – From sketches by a staff artist', depicting the techniques employed in trapping live Passenger Pigeons for sporting contests. The illustration and text are reproduced here in their entirety for the first time (Fig. 3). The accompanying text entitled 'Wild pigeons for the sportsmen's tournament' includes an extra illustration of a pigeon trap (Fig. 4) and important documentation about trapping techniques and pigeon ecology, all based on the recollections of a professional pigeonier. The newspaper *Harper's Weekly* (*HW* hereafter), published on 9 July 1881, one week after the above-mentioned *FLIN* article, contains another overlooked illustration entitled 'Sportsmen's Convention – Pigeon shooting at the Brighton Beach Fair Grounds, Coney Island', and it is also reproduced here in its entirety for the first time (Fig. 5).

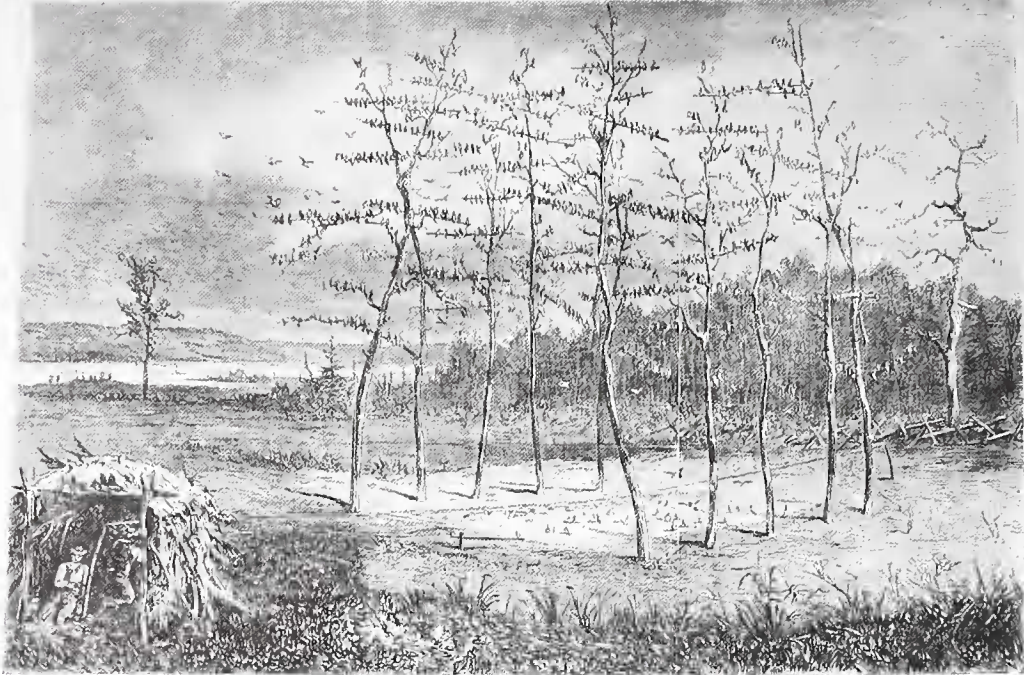
Frank Leslie's Illustrated Newspaper

Frank Leslie (29 March 1821–10 January 1880) was born in England but made his name as a newspaper and family periodical publisher in the USA, illustrating and engraving many pictures himself (Peterson 1933). *Frank Leslie's Illustrated News*, which was originally entitled *Leslie's Weekly*, was first published in 1855 in New York and ran until 1922 (*ibid*). This newspaper was most famous for its detailed descriptive and illustrative coverage of the American Civil War, but also treated general interest topics such as natural history.

Shooting wild pigeons in Iowa (FLIN, 21 September 1867).—The Passenger Pigeon illustration 'Shooting wild pigeons in Iowa' (Fig. 1) is accompanied by an interesting account concerning the destruction that these birds caused to agricultural crops, being described as a 'perfect scourge' to the farming community in Iowa. It reads:

'The farmers of many of the western counties of Iowa were much troubled with pigeons in the spring; in fact, the hordes became a perfect scourge. Vast flocks made their appearance, the air in many places being literally darkened, and having migrated a long distance from the South, they were very voracious. These flocks lit upon the fields of the new-sown corn, and rolling over and over like the waves of the sea, picked up every kernal [*sic*] of grain in sight. It was impossible to drive them away; they being unmindful of the firing of guns, throwing of stones, shouting of men, or barking of dogs; and it was an easy task to kill any number of them with a pole.'

'One farmer, residing two miles east of Independence, had sown three acres of wheat, and was preparing to harrow it in, when the pigeons made their appearance, and gobbled every kernal [*sic*] before he could get it covered. Some fields containing forty acres were absolutely covered with pigeons, and although sportsmen waged an incessant warfare



NETTING WILD PIGEONS IN NEW ENGLAND

Netting Wild Pigeons in New England.

Large flocks of wild pigeons, which at first are rarely killed out West, become more shy as they reach further North, so that by the time they reach New England, besides being reduced in numbers, they are more difficult to capture, and therefore are hunted in the way illustrated in our sketch. A class of contrivance is built, and the hunters get behind it, having prepared their net, which works with a cord running into their cover, and having also decoy pigeons placed on the ground, with their legs tied with string, which also run to the cover. Having made these preparations, and spread the ground with buckwheat, they retire to their shelter, and by pulling the string connected with the decoy pigeons, they are made to flutter and seem as though they were just alighting on the field. By this appearance the wild pigeons are attracted and fly down

into the field. When a sufficient number have been collected together, the net is pulled over them by the string, they are taken out by hand, and the net set again. The number of pigeons taken in this way is often quite large, and being frequently enough to make a day spent in capturing them quite profitable. It happens, at times, when the pigeons are quite plentiful, that most of the young have in the vicinity spread their time in this way, combining both pleasure and profit.

Shooting Wild Pigeons in Iowa.

The farmers of many of the western counties of Iowa were much troubled with pigeons in the spring. In fact, the hordes became a perfect scourge. vast flocks made their appearance, the air in many places being literally darkened, and having

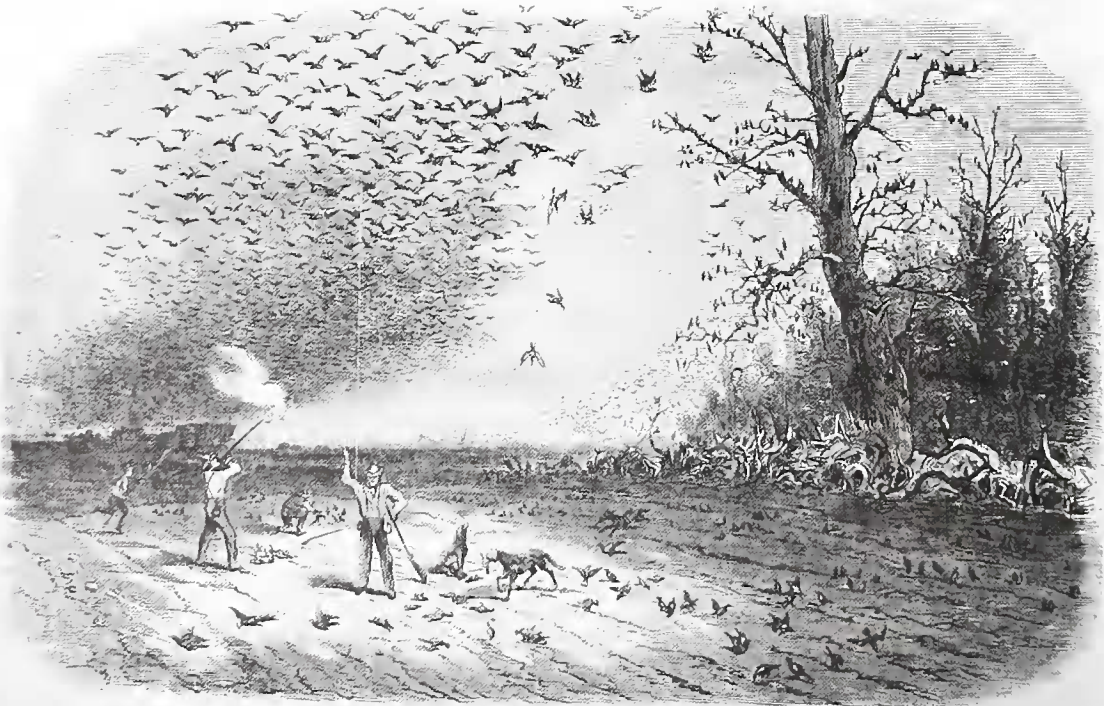
mingled a long distance from the south, they were very voracious. These flocks lit upon the fields of new-sown grain, and rolling over and over like the waves of the sea, picked up every kernel of grain in sight. It was impossible to drive them away; they being unmindful of the firing of guns, throwing of stones, shouting of men, or barking of dogs; and it was an easy task to kill any number of them with a pole.

The farmer, residing two miles east of Independence, had sown three acres of wheat, and was preparing to harrow it in, when the pigeons made their appearance, and gobbled up every kernel before he could get it covered. Some fields containing forty acres were absolutely covered with pigeons, and although sportsmen waged an incessant warfare against them, and killed great numbers of them, their places were soon supplied with others. Hunting pigeons had lost the

charm of novelty, and the usual question was how to save grain. A great number of fields had to be sowed a second time, and, it is said, some farmers had to do it the third time. From all accounts, the main depredations of the feathered scourge appeared to be confined to the region of country bordering the Wapaisippian.

View of Bay Street, Savannah, Georgia.

BAY STREET, in Savannah, is the chief cotton market of the town, and is filled with a constant procession of carts conveying the bales of the staple either to the storehouse or the wharves for shipment. There has always been a business rivalry between Charleston and Savannah, and since the war the latter named place appears to have taken the lead decidedly. Our sketch shows the mode in which cotton is carted



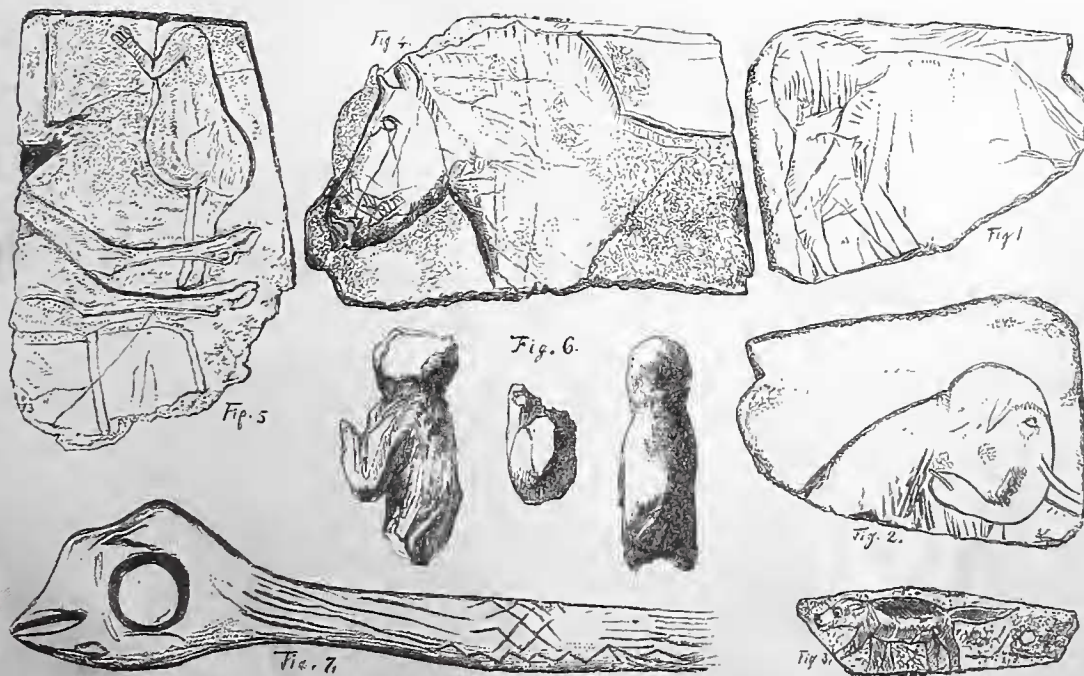
SHOOTING WILD PIGEONS IN IOWA.

Figure 1. The full-page spread that appeared in the 2 July 1867 edition of *Frank Leslie's Illustrated Newspaper* (vol. XXV, no. 625, p. 8) entitled 'Netting wild pigeons in New England' (above) with an accompanying image entitled 'Shooting wild pigeons in Iowa' (below). From the author's personal collection.

THE ILLUSTRATED SPORTING AND DRAMATIC NEWS, JULY 3, 1875. — 337



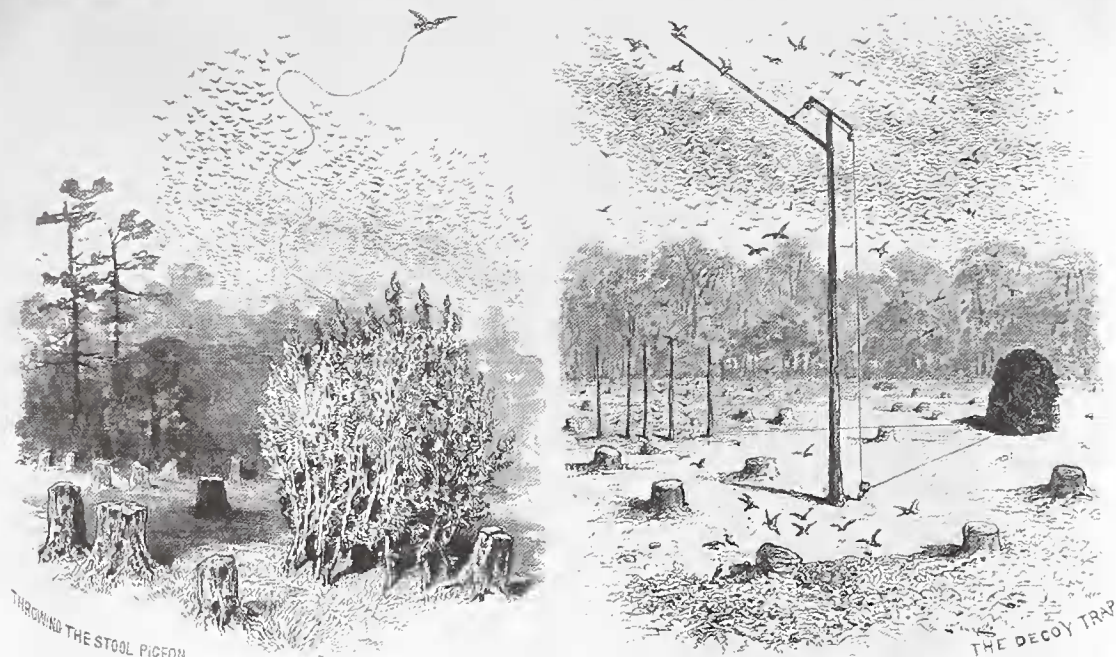
WINTER SPORTS IN NORTHERN LOUISIANA: SHOOTING WILD PIGEONS.—SKETCHED BY SMITH BENNETT.



SPECIMENS OF THE LATEST PREHISTORIC DISCOVERIES

FROM TRACINGS BY OTIS F. MASON.

Figure 2. The full-page spread of the much-reproduced illustration 'Winter sports in northern Louisiana: shooting wild pigeons. - sketched by Smith Bennett', which appeared on p.332 in *The Illustrated Sporting and Dramatic News* on 3 July 1875. From the author's personal collection.

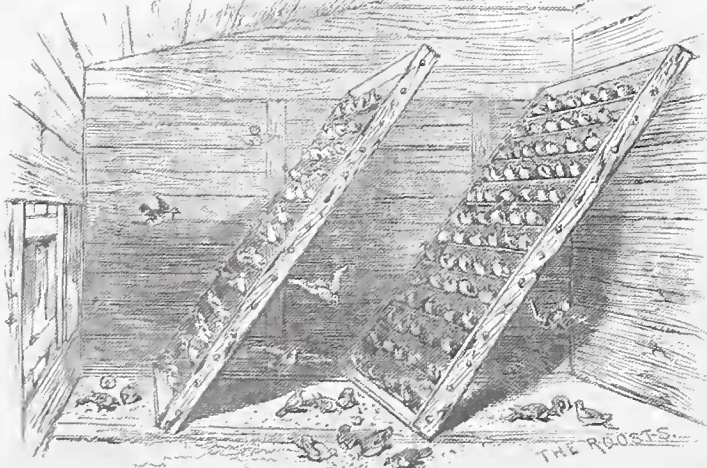


THROWING THE STOOL PIGEON

THE DECOY TRAP



TAKING THE BIRDS FROM THE TRAP NET & CAGING THEM.



THE ROOSTS.



WILD PIGEON

THE SPORTSMEN'S TOURNAMENT AT CONEY ISLAND.—METHODS OF TRAPPING AND TRANSPORTING THE PIGEONS FOR USE IN THE CONTESTS.—FROM SKETCHES BY A STAFF ARTIST.—SEE PAGE 299.

Figure 3. The full-page spread that appeared in the 2 July 1881 edition of *Frank Leslie's Illustrated News* (vol. LII, no. 1344, pp. 299–300). The illustration on p. 300 is entitled 'The sportsmen's tournament at Coney Island.—Methods of trapping and transporting the pigeons for use in the contests.—From sketches by a staff artist.' Note the incredible density of birds captured in the trap-net (centre right). From the author's personal collection.

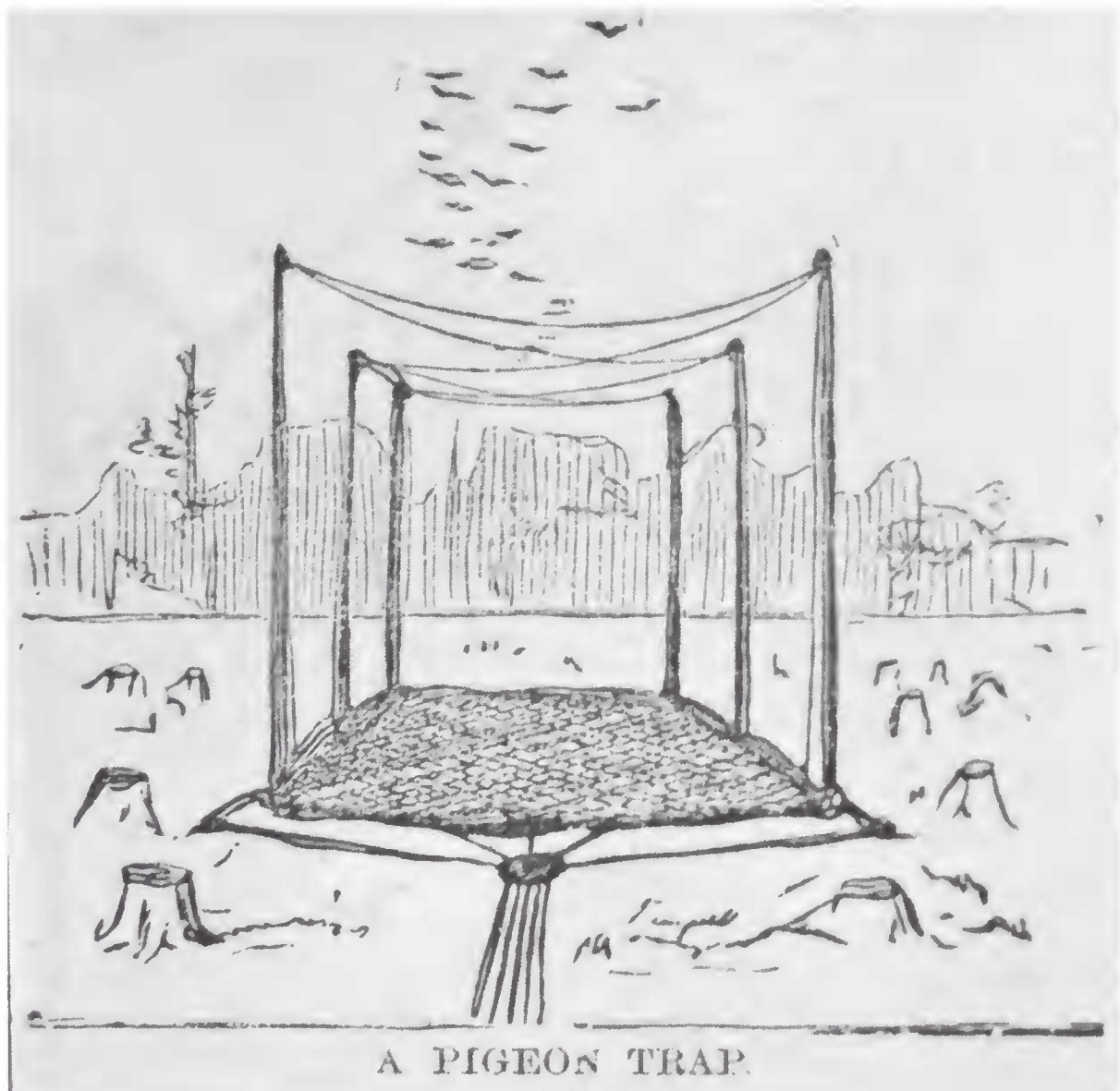
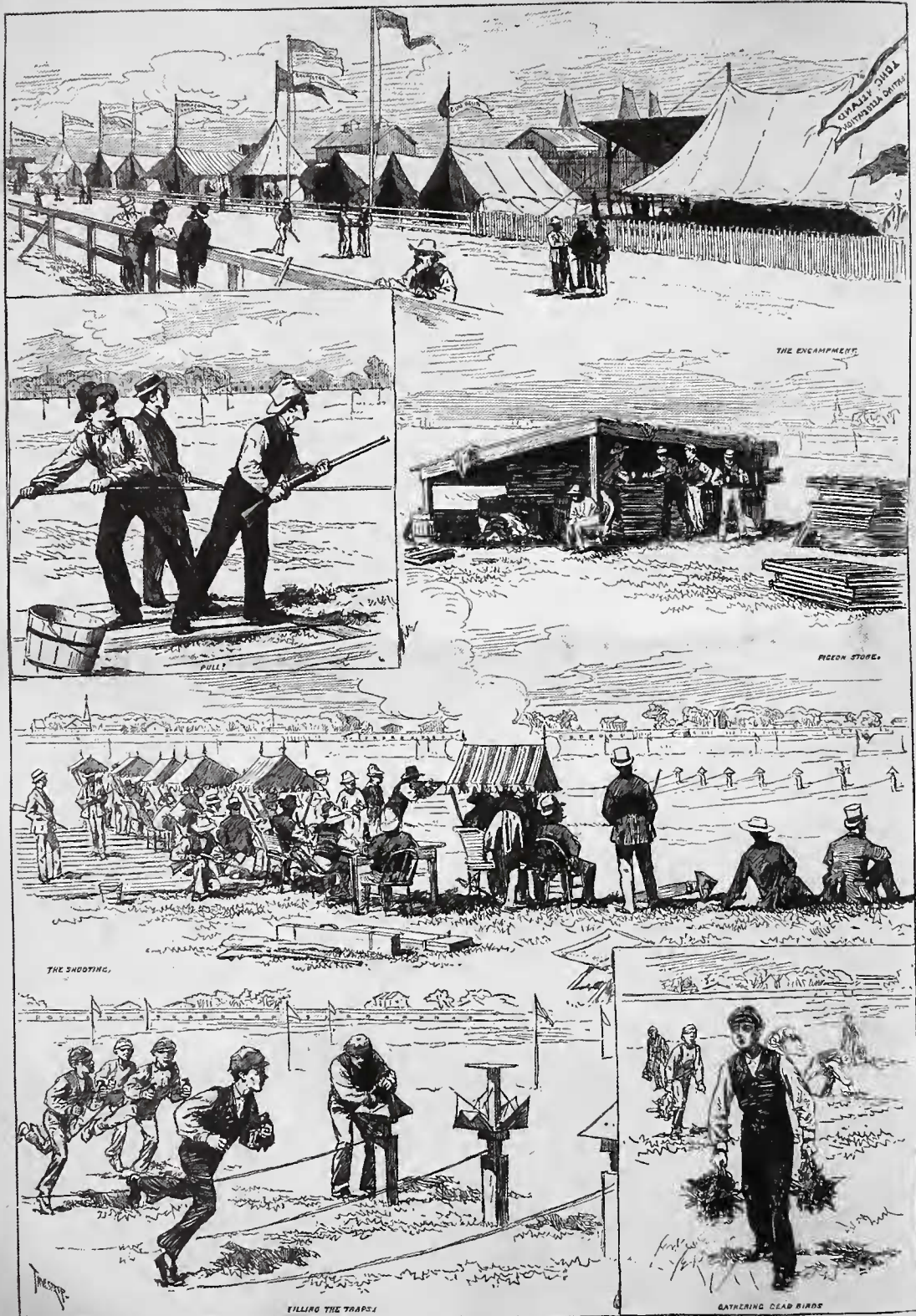


Figure 4. The illustration 'The pigeon trap' on p. 299 that accompanied the article entitled 'Wild pigeons for the sportsmen's tournament'. From the overlooked article that appeared in 2 July 1881 edition of *Frank Leslie's Illustrated News* (vol. LII, no. 1344, pp. 299–300).

against them, and killed great numbers of them, their places were soon supplied with others. Hunting pigeons had lost the charm of novelty, and the main question was how to save grain. A great number of fields had to be sowed a second time, and, it is said, some farmers had to do it the third time. From all accounts, the main depredations of the feathered scourge appeared to be confined to the region of country bordering the Wapsipinicon.'

Wild pigeons for the sportsmen's tournament (FLIN, 2 July 1881).—This overlooked article appeared in *FLIN* on 2 July 1881 (vol. LII, no. 1344, pp. 299–300). The accompanying account to the illustration (Fig. 3) appeared on p. 299, and is based on an interview with Mr. W. P. Thomas, a professional 'pigeoner' from Phillipsburg, New Jersey. The shooting of live pigeons for sport had become extremely popular, and trap-shooting, which involved the controlled release of birds from specially designed traps, was a lucrative business (Mitchell 1935, Schorger 1955). The article reads:

'The business of trapping pigeons for field sport, as carried out this year in the Western States and Territories, has attained extensive proportions. Heretofore, the pigeons have



SPORTSMEN'S CONVENTION—PIGEON SHOOTING AT THE BRIGHTON BEACH FAIR GROUNDS, CONEY ISLAND.—DRAWN BY T. DE THULSTRUP.—[SEE PAGE 443.]

Figure 5. The overlooked full-page illustration entitled 'Sportsmen's convention—Pigeon shooting at the Brighton Beach Fair Grounds, Coney Island. Drawn by T. De Thulstrup', which appeared on p. 444 in the 11 July 1881 edition of *Harper's Weekly* (vol. XXV, no. 1280, pp. 443–444). The image bottom right records the ultimate fate of most captured Passenger Pigeons.

roosted in Pennsylvania and Michigan. But this year, owing to the late cold spring, they did not come as far north as usual, and they made a roost in the Pottawattamie Reservation of the Indian Territory, 119 miles away from the nearest railway station. The trappers transported in wagons their lumber and supplies to the vicinity of the roost, three days being occupied in the journey. Mr. W. P. Thomas, of Phillipsburg, New Jersey, who had contracted to supply wild pigeons to the New York State Sportsmen's Association, states that the roost is the largest he has ever seen.'

"The country there," he said, in a recent interview, "is thickly grown over with what they call post-oak timber. The acorns are so abundant that it is a splendid feeding-ground for the pigeons. I went into the roost for about ten miles without finding any signs of an end. Every tree was thick with pigeons, their weight the branches bending down. When the birds have been coming home from the feeding-grounds in the evening, I have seen a stream about a mile broad flow through the air for two hours thick enough to hide the sun, and making a noise like thunder. I should judge the roost to be about twenty miles long and fifteen broad."

'Mr. Thomas explained the methods of the trappers. The nets used will cover a space of forty feet by thirty. One end of the net is fastened to a rope, which is drawn taut, so that when let go the net is thrown out like an arrow, falling upon the pigeons that have gathered in front of it. The pigeons are generally caught on their feeding-grounds or their water-beds. When a good feeding ground is located the nets are set, and the trapper puts himself in a hut of boughs at one end of the net line. Pigeons are saved from one season to another for use as decoys. When a flock of pigeons is seen coming, a pigeon is thrown up in the air to attract the attention of the flock, the bird being pulled down again with a string. This bird is called the flyer. Another decoy bird called the stool-pigeon is made use of at the same time. He is tied to a perch on the free end of a strip of iron band about four feet long. As the flock approaches a string is pulled, which makes the string bounce him up and down, and he flaps his wings to keep his balance. He presents the appearance to the approaching flock of a bird hovering over a feeding-ground, and they settle down around him. Mr. Thomas once saw sixty-seven dozen caught at one cast of the net, but thirty or forty dozen is an average big catch. Sometimes there will be only a dozen or so.'

'The pigeons are caught on water-beds as well as feeding-grounds. A water-bed is made by filling an excavation with water. The pigeons on their way home from feeding



ALBERT COOPER, SOLEBURY, PA.
Trapper of Wild Pigeon with Blind Decoys,
about 1870.

Figure 6. A professional 'pigeoner' Albert Cooper with blind Passenger Pigeon *Ectopistes migratorius* decoys c.1870. Taken from Paxson (1917).

will stop to drink, and are caught under the nets. Sometimes salt is used "This season" said Mr. Thomas, "the acorns were so plentiful that the birds did not have to search for feeding-grounds and did not decoy well. The water-beds did not draw well, either, as they had the Canada River, the water of which is alkaline, so that salt had no attraction for them. We caught the most on gravel-beds along the river as they would settle down for stones to put in their crops to grind up the acorns."

'Pigeons are methodical in their habits in these great roosts. Early in the morning the Tom flight occurs. This is composed of the male birds on their way to the feeding grounds. When they have fed and drunk, they return to the nests, and the female birds go to feed. The hen flight takes place between eight and nine o'clock. In the afternoon there is another Tom flight, and towards evening another hen flight. The birds stop for gravel or water on their way home from feeding.'

'The crates in which the birds are put when caught are simply large, flat coops. The netters are spread over an area of twelve or fourteen miles. Every evening the teams make a round and collect all the crates. It is now necessary to get the birds "on their feed," or else they will die. They are put in pens and given corn to eat, with plenty of water to drink. For several days after they are captured they will scarcely eat at all, and it is only after they have become accustomed to the change that they can be again crated and shipped.'

'In shipping them by rail two men travel in each car, and the pigeons are regularly fed and watered. On the 11th instant, a car containing 8,500, shipped from Atoka, in the Indian Territory, arrived at Jersey City, being the first instalment of the 20,000 which Mr. Thomas has contracted to supply to the Sportsmen's Association for the tournament now in progress at Coney Island. The pigeons were placed in pens, from which they will be taken as wanted. These pens are simply low, closed sheds. An inclined plane of slatted framework in each pen furnishes the pigeons with a roost, as shown in our illustration [Fig. 3].'

'These wild pigeons are smaller than the domestic pigeon. Their plumage is a mixture of slate and gray. They have long tail feathers, are birds of far quicker and stronger flight than ordinary pigeons.'

Harper's Weekly

Harper's Weekly was first published in 1857 in New York and was created by Fletcher Harper and his brothers, with the final issue appearing in 1916 (Mott 1967). Like *FLIN*, *HW* published on a range of topics including coverage of the Civil War, and the publication attracted some of the best artists available at the time.

Sportsmen's convention—Pigeon shooting at the Brighton Beach Fair Grounds, Coney Island (HW, 9 July 1881).—This full-page spread entitled 'Sportsmen's convention—Pigeon shooting at the Brighton Beach Fair Grounds, Coney Island. Drawn by T. De Thulstrup' (Fig. 6) appeared on p. 444 in the 9 July 1881 edition of *HW* (vol. XXV, no. 1280, pp. 443–444) with accompanying text on p. 443 entitled 'Pigeon shooting'. The sheer scale of the sport can be seen in the size of the encampment (top), and the image directly below shows the 'pigeon store' under a wooden cover, with each of the crates packed with live birds ready for the contest. The stack of empty crates outside, and the gathering by hired youths of dead birds (bottom right), is a grim reminder of the ultimate fate of live-captured Passenger Pigeons.

Discussion

During the mid 1870s, such was the abundance of pigeon meat that the hunters could not recoup the financial costs of sending the bodies to market, which resulted in an increase

of trapping live birds (Schorger 1955). Furthermore, the number of professional ‘pigeoners’ (Fig. 6), who pursued the pigeons year-round, had doubled from 600 in 1874 to 1,200 by 1881 (*ibid*). The scale of live-trapping is also appreciated by statistics taken from the plundering of the last great colonial concentrations. Of an approximate 1,107,866 birds taken dead or alive in 1878 from the last great nesting at Petoskey, Michigan, from smaller colonies at Boyne Falls and Cheboygan, plus an estimate of 100,000 at other points, the number of live birds taken for sport was 252,466 (Mitchell 1935: 143), or one-quarter of all birds taken.

In the mid 1870s, public protest against trap-shooting commenced in earnest (Schorger 1955). The birds suffered terrible treatment before being let loose as living targets on the shooting ranges. Many were weakened and unable to fly properly or had sustained head and wing injuries due to cramped cages, only to be killed by the gun once released (*ibid*). Furthermore, few pigeons escaped alive, as any making their escape were picked off by boys and others with their guns waiting around the tournament perimeter (Dury 1910). By the late 1880s, pigeon trapping for the shooting industry was in decline, but had not been fully abolished (Schorger 1955). It only ceased when no more pigeons were available.

The *FLIN* article shows that (in 1881) it was still possible for ‘pigeoners’ to supply thousands of live birds to the sporting industry in New York state, and other concentrations were also exploited during the following few years (Schorger 1955, Greenberg 2014). These flocks were still enormous, but subsequent colonies never reached former densities, with the last being recorded in 1889 (Greenberg 2014); by the mid 1890s the pigeon was probably effectively extinct as a wild breeding bird.

Why did the Passenger Pigeon disappear when all other gamebirds survived? Several reasons have been put forward for this dramatic decline (see Blockstein & Tordoff 1985, Butcher 1992, Blockstein 2002 for a comprehensive study). The answer appears to lie in its unusual ecology. Evidence suggests that almost the entire population periodically concentrated in a very few places (Hume & Walters 2012), and that these were subject to intense exploitation. Furthermore, Blockstein & Tordoff (1985: 850) strongly argued that the collapse from incredible numbers to functional extinction over a 20-year period, (about twice an individual’s lifetime), was because of the almost complete prevention of successful reproduction. There is no species, however abundant, that can survive perpetual, uncontrolled persecution in which the killing of adult birds far exceeds fecundity, i.e. ‘blitzkrieg effect’. To add to the bird’s misfortune, Passenger Pigeon occupied a part of the USA that, although vast, was inhabited by a rapidly increasing human population. With the odds so steeply stacked against it, there can be no real surprise that the Passenger Pigeon disappeared in such a short space of time.

The text that accompanied the *HW* 1881 article sums up the attitude of association members who took part in a wild pigeon (Passenger Pigeon) shooting tournament organised by the Annual Convention of the New York State Association for the Protection of Fish and Game. In defence of the tournament, the organisers provided the following statement:

‘Those whose knowledge of this association is limited to the reports of its annual conventions are likely to form an erroneous impression of its character and purposes. It has an important function, and one which it has exercised greatly to the benefit of the community – the enforcement of the laws of the protection of fish and game in this State, without which our rivers, streams, fields, and forests would cease in a short time to be sources of food supply.’

The *HW* text suggests that any conservation role of the Association was strictly utilitarian; either they did not care about Passenger Pigeon because of its pest status,

or they did not truly realise it was under serious threat of extinction. Furthermore, the public movement protesting against trap shooting of pigeons appears to have been based on humanitarian grounds and not based on concern for the population. That a species so incredibly numerous could entirely disappear seems to have been beyond the comprehension of most of those involved. History has shown what a misguided concept this proved to be.

Acknowledgements

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References:

- Audubon, J. J. 1831. *Ornithological biography, or an account of the habits of the birds of the United States of America*, vol. 1. Edinburgh.
- Avery, M. 2014. *A message from Martha*. Bloomsbury, London.
- Blockstein, D. E. 2002. Passenger Pigeon *Ectopistes migratorius*. Pp. 1–28 in Poole, A. & Gill F. (eds.) *The birds of North America*, no. 611. The Birds of North America, Inc., Philadelphia.
- Blockstein, D. E. & Tordoff, H. B. 1985. Gone forever: a contemporary look at the extinction of the Passenger Pigeon. *Amer. Birds* 39: 845–851.
- Bucher, E. H. 1992. The causes of extinction of the Passenger Pigeon. *Current Orn.* 9: 1–36.
- Cokinos, C. 2000. *Hope is the thing with feathers; a personal chronicle of vanished birds*. J. P. Tarcher / Penguin, New York.
- Dury, C. 1910. The Passenger Pigeon *Ectopistes migratorius*, Linn. A reminiscence. *J. Cincinnati Soc. Nat. Hist.* 21: 52–56.
- Eckert, A. W. 1965. *The silent sky: the incredible extinction of the Passenger Pigeon*. Little Brown & Co., New York.
- Foster, J. W. 2014. *Pilgrims of the air*. Notting Hill Editions, London.
- Fuller, E. 2014. *The Passenger Pigeon*. Princeton Univ. Press.
- Greenberg, J. 2014. *A feathered river across the sky: the Passenger Pigeon's flight to extinction*. Bloomsbury, New York.
- Henniger, W. F. 1902. A preliminary list of the birds of middle southern Ohio. *Wilson Bull.* 9: 77–93.
- Hume, J. P. & Walters, M. 2012. *Extinct birds*. T. & A. D. Poyser, London.
- Mitchell, M. H. 1935. The Passenger Pigeon in Ontario. *Contrib. Roy. Ontario Mus. Zool.* 7: 1–181.
- Mott, F. L. 1967. *A history of American magazines, 1850–1865*. Belknap Press, Cambridge, MA.
- Paxson, H. D. 1917. The last of the wild pigeon in Bucks County. *Bucks County Hist. Soc.* 4: 367–382.
- Peterson, A. E. 1933. *Dictionary of American biography*. Charles Scribner's Sons, New York.
- Schorger, A. W. 1955. *The Passenger Pigeon: its natural history and extinction*. Univ. of Wisconsin Press, Madison.
- Shufeldt, R. W. 1915. Anatomical and other notes on the Passenger Pigeon (*Ectopistes migratorius*) lately living in the Cincinnati Zoological Gardens. *Auk* 32: 29–42.
- Wilson, A. 1808. *American ornithology*, vol. 5. Bradsford & Innskeep, Philadelphia.
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